DOCUMENT RESUME

ED 111 137 EC 073 511

AUTHOR Thiagarajan, Sivasailam
TITLE To Understand the Child: Design and Development of Anticipation Games. IDL Working Paper 9.12.
INSTITUTION Indiana Univ., Bloomington. Center for Innovation in Teaching the Handicapped.
SPONS AGENCY Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
PUB DATE Sep 71
GRANT OEG-0-9-242178-4149-032
NOTE 35p.; For related documents see EC 073510 and 073512

EDRS PRICE MF-$0.76 HC-$1.95 Plus Postage
DESCRIPTORS Exceptional Child Education; *Expectation; *Games; *Handicapped Children; Material Development; Student Teaching; *Teacher Attitudes; *Teacher Education

ABSTRACT

Discussed is the development of games which provide teacher-trainees with experience in anticipating the responses of different types of handicapped children to different tasks. It is explained that the games are inexpensive, that they permit the trainee to become a participatory observer in an interactional setting, and that they provide immediate feedback based on empirical data. Four sample games are described in which trainees anticipate responses from student populations such as foreigners or the emotionally disturbed. The process of developing anticipation games is outlined in the following steps: task analysis, preparing question cards and collecting norms, designing and developing the game, and constructing testing instruments and validating the game. Appended are specific instructions for two variations of anticipation games. (LS)

TO UNDERSTAND THE CHILD

Design and Development of Anticipation Games[1]

Sivasailam Thiagarajan

September 25, 1971

IDL Working Paper 9.12

[1]This research was supported by grant #OEG 9-242178-4149-032 from the U. S. Office of Education, Bureau of Education for the Handicapped to the Center for Research and Development for Handicapped Children.

IDL Working Paper 2

TO UNDERSTAND THE CHILD

Design and Development of Anticipation Games

Sivasailam Thiagarajan

The teacher who manages to keep her cool in a crowded classroom probably possesses the very important ability to anticipate different responses of different pupils. This anticipatory skill enables her to require appropriate responses from each individual pupil and thus prevent frustration and failure. The same skill enables her to react efficiently to any emergency and provide remedial instruction or reinforcing consequences.

Anticipatory skills are seldom developed through the study of textbooks. Rather, it is a clinical sense which is developed through repeated interaction with different types of children in different situations. Unfortunately, most preservice teachers rarely have this opportunity. It has been suggested that this lack of experience could be compensated through the use of protocol materials (Babick and Gliessman, 1970). In this method, realistic records of classroom situations provide vicarious experiences to the teacher-trainee. However, in this case, the teacher-trainee is not required to make active anticipations. Neither does she receive any useful feedback. More elaborate simulation packages (e.g., Kersh, 1964) permit the teacher-trainee to participate in the classroom situation at various critical points and to receive feedback through one of the multiple film tracks. Even in this case the feedback is based on expert opinion rather than empirical data.

At the Center for Research and Development on the Improvement of the Teaching of Handicapped Children we are developing a series of inexpensive games which permit the player to become a participatory observer in an interactional setting. This game requires the players to repeatedly anticipate the responses of different types of children to different tasks. It also provides immediate feedback based on empirical data: The winner for each round of the game is the player whose anticipation is the closest to the most frequent response of an appropriate group used in an earlier survey. The greatest instructional strength of the game lies in the fact that the success of the player depends not upon expert opinion, nor upon particular generalizations about handicapped children but upon actual normative data. In this way, the feedback to the player is as realistic as the feedback to the classroom teacher. However, the player experiences a large number of anticipation-feedback cycles in a limited period of time. Thus systematic efficiency of simulation games is added to the reality of the classroom.

Here is a brief description of one of the games of the series:

GAME 1: ANTICIPATION

The most important materials used in this game are question cards from different curriculum areas such as language, arithmetic, social skills and general information. There are a number of question cards in each area. A sample question card from the general information area is shown below:

Where does paper come from?

	EMR	E-D	NOR
A. Trees	1	2	1
B. School	4	5	4
C. Paper boy	3	3	3
D. Wood	2	1	2
E. Teacher	5	4	5

A sample question card used in the game ANTICIPATION. Dotted lines indicate the position of the mask which conceals frequency ranks.

The top half of the card contains a free-response question which the children are asked. The lower half contains five of the most frequent responses from the standardizing groups of children. These responses are listed in a random order. For each of these responses, frequency ranks are provided for each group of children. These ranks are covered by a cardboard mask. A rank of 1 stands for the most frequent, and 5 the least frequent, response from that group of children. Thus in the sample card, "Trees" is the most frequent response for normal and EMR children while the emotionally-disturbed children come up with "Wood" most often.

Four players usually participate in the game although it could be played by any number from two to ten. Each player is provided with counters of his own color. A game board is used for keeping score. This is a 3 x 4 matrix in which the rows stand for different types of children (normal, EMR and emotionally-disturbed children) and the columns for different curricular areas (language, arithmetic, social skills and general information).

NORMAL LANGUAGE	NORMAL ARITHMETIC	NORMAL SOCIAL SKILLS	NORMAL GEN. INFORMATION
EMR LANGUAGE	EMR ARITHMETIC	EMR SOCIAL SKILLS	EMR GEN. INFORMATION
EMO. DISTD. LANGUAGE	EMO. DISTD. ARITHMETIC	EMO. DISTD. SOCIAL SKILLS	EMO. DISTD. GEN. INFORMATION

The Game Board

Every time a player correctly anticipates the response of a given group of children to a given question, he places a counter of his own color on the appropriate cell in the board.

During each round of the game, one player names the group of children whose response he is going to anticipate. He then picks a question card from any curricular area of his own choice. All players read the question and each chooses a response which he thinks to be the most probable.

Each player then gives a brief reason why he thinks a particular response is the most frequent and attempts to persuade others to change their choice to this one. The player may describe his genuine feelings or try to "con" others into making an error. The mask is then lifted to reveal frequency ranks. The player with the highest rank wins the round and places his counter on the appropriate cell of the board. All unsuccessful players lose a counter from the board. A new round begins with the player who has been successful in convincing most of the others to change their minds. The object of the game is to score points by completing any row (becoming an expert in a subject-matter area), column (becoming a specialist in a particular group of children), the entire board (becoming a generalist) or by getting ten counters on the same cell (becoming a super specialist).

Although the actual game has a few other procedural rules and a number of variations, this brief description should give the reader a flavor of the mechanics of the game and the excitememt it is capable of creating. The game is still in the process of formative evaluation and refinement.

All of us have conscious and unconscious hypotheses about how a particular type of person would behave in a particular situation whether it be a communist at the peace talks, a Martian on meeting the first earthling, a blond confronted with a high-level cognitive task or an ordinary citizen meeting a nude on the elevator. The basic variables in anticipating a person's behavior are the type <u>person</u> he is and the type of <u>situation</u> he is in. Subject and situation are the two essential ingredients of anticipation games and in the sample game described above, there are three types of subjects (normal, emotionally-disturbed and EMR children)

and four classes of situations (language, arithmetic, social skills and general information). By varying the subjects and the situations different anticipation games may be designed to serve different purposes. Here are some more examples from our series of anticipation games:

GAME 2: PYGMALION

In discussing the relationship between teacher expectancies and the performance of handicapped children on various tests, a number of people have wondered if these two factors do not constitute a vicious circle. A recent survey by Meyen and Carr (1970) indicates that teachers and experts estimate EMR pupils to be about five years behind their normal counterparts. Although actual test results substantiate these estimates, the investigators believe that this could be a result of delayed instruction rather than an excuse for delaying instruction. There is no doubt that low expectancies about EMRs prevent teachers from trying out new teaching moves.

The following anticipation game variation is developed to reduce the perceived differences between differentially labeled groups of children.

In this exercise you are to decide which of the four words has most nearly the same meaning as the word which is underlined above them.

25. Return home
1) stay
2) leave
3) dream of
4) go back

Sixty percent of normal children can respond correctly to this question at the median age of 8.0 yrs.

At what age do you think 60% of the EMRs can respond correctly to the same question?

A sample question card used in the game PYGMALION.

Question cards used in this game contain multiple-choice items. The median age at which 60% of normal children respond correctly to the question is given below the question. This age is obtained from Meyen and Carr's (1970) data. The task for the players is to guess the median age for the same 60%-correct performance on the part of EMR pupils. The "correct" age is given on the back of the card. However, rather than use the actual age from Meyen and Carr's data, a hypothetical age reflecting a lag of about one year is substituted. For example, the median age at which 60% of EMRs respond correctly to the item above is 15.0 years. However, the card gives this age as 9.1 years.

The winner for each round of PYGMALION is the player whose estimate is the closest to the age given on the back of the card. Results from our developmental testing indicate a reliable change in the expectancies of most of the players. This change is measured by having each player respond to ten random cards before and after the game under the guise

of providing practice for the first two games. Almost invariably, the player's age estimate drops down three or four years after the game. It is interesting to note that most players refuse to believe a table of both ages as real data if presented directly. This finding seems to be in line with Festinger and Macoby's (1964) hypothesis about the effect of distraction in eliminating covert counterarguments. The excitement of the game appears to be a strong distractor aiding the change in expectancies.

GAME 3: BOB AND ALICE AND TED AND CAROL

A useful adjunct for accurate anticipation of individual behaviors is the diagnostic test profile. However, most teachers of the handicapped are ill equipped to interpret them realistically. Apart from their lack of technical skill they also suffer from extreme attitudes: Some have no faith in test data and make purely random predictions. Others believe in them blindly, categorize a child under a label and attempt to apply all the assumed group characteristics to him.

The following anticipation game is designed to make the player aware of the merits and limits of test data in anticipating individual responses.

This game uses the same set of questions used in the ANTICIPATION game (page 2). However, rather than listing the most frequent responses from the standardizing group, verbatim responses of four children are listed in different random orders. The four children from whom the responses were collected represent "normal," "emotionally-disturbed," "high educable," and "low educable" groups.

Each player in this game is also supplied with a set of test data similar to that given to a teacher. These include the child's latest IQ, scores on standardized tests on reading and arithmetic, grade expectancy, data on social maturity and emotional stability and other significant anecdotal data. Players may study these data before the game and refer to them during the game. The task for the player is to guess which of the four responses is made by a particular child. The player who makes more correct guesses about more children's responses wins the games.

Spontaneous comments during the developmental testing of this game indicate that it is achieving its objectives. Here are a few sample comments:

"Bob's so unpredictable that I start from scratch everytime I make a guess. No wonder his teacher reports him to be moody."

"The way I figured out is that Alice operates as if she were a normal kid three years younger."

"I think Ted's smarter than what his reading scores indicate."

"I find the scores useful for getting a general idea of the kid. But I also try to remember how he answered another question in the same area."

GAME 4: ASK A SILLY QUESTION . . .

Studies by Lynch and his associates (1970) on the distribution of types of questions in special education classrooms indicate that most of the teachers make very low-level cognitive demands of the child. Lynch feels this to be an inefficient teaching strategy. One of the

probable reasons for the lack of use of broad, open-ended questions is that it is very difficult to anticipate a handicapped child's response to them. The following anticipation game was developed on the belief that the game would give a wide variety of experience with different types of questions.

This game uses the usual grouping of pupils into normal, emotionally-disturbed and EMR children. The questions, however, are classified according to Lynch's Cognitive Demand Schedule irrespective of their subject-matter areas. These classes include discriminating, chaining, informing, explaining, classifying, relating, inferring, imagining, evaluating and problem solving. The task for the players is to anticipate the responses to a question from a particular category. The rules of the game provide more rewards to correct anticipations of responses to higher-level questions than to lower-level ones. Thus anticipating a child's response to a problem-solving task is worth four times as many points as a routine response.

GAME 5: THOSE FOREIGNERS

The next game illustrates the flexibility and wide applicability of this technique. It was developed by a teacher of college-student personnel in response to the problem of student counsellors expecting their own standards and values from "international" students or grouping them all into the category of being totally different.

This game involves foreign students classified into four cultural groups and interview questions classified into four problem areas of academic adjustments, housing and food, finances and social adjustment.

The game is played as usual, the task for the players being the anticipation of the most frequent complaint from a particular group of foreign students in a particular area. Players' anticipations are compared with questionnaire data available in the international students' office.

DEVELOPING ANTICIPATION GAMES

This section of the paper deals with the actual process of developing games of this type to meet specific instructional needs. Although many of the techniques discussed below are usable in the design of any instructional game, this paper concentrates upon anticipation games that are similar to those described in the earlier section.

Step 1: Task analysis

What type of instructional problem lends itself to the use of anticipation games? What instructional objectives are efficiently attained by these games?

Anticipation games are useful when the objective of a training program involves the understanding of people. This objective is usually stated in such non-Magerian terms as "become more aware of individual differences among children," "be able to discriminate between different types of children," "realize varying competencies of the learners in the classroom," and "appreciate the effects of different treatments on different people." Anticipation games provide an operational definition of at least one aspect of understanding children. An indicator of such understanding is the ability to predict the responses of different children to the same situation, of the same children to different situations and of different children to different situations.

Anticipation games are particularly effective in those situations in which previous experiences and prejudices prevent people from facing reality: Such a problem is frequently encountered in educating handicapped children ("Deaf kids can never write a straight sentence!"), and in introducing new curriculum ("New math is tough on the kids!") or new techniques of teaching ("It's good to use divergent questions, but who's going to give an answer?"). At the other extreme, the game prevents people from gullibly accepting glowing generalities ("If you treat the kids like they were normal, they will be normal." "With this method. you can teach twice as much in half the time.") and subsequently becoming disillusioned.

Having determined that an anticipation game is useful in your instructional situation, the next step is to identify classes of representative people and of situations across which anticipation skills are to be applied. In most teacher training situations, the people are pupils who may be classified in ways such as these:

by sex (e.g., in a game on problems of adolescence)

racially (in a game for inner-city teachers)

academically (by grade level, GRE, performance on a test, etc.)

chronologically

according to Piagetian stages of development

Similarly, the situational or task variable may be divided into such groupings as the following:

level of questioning

type of media

curricular area

type of instructional objective

nature of task

Although these examples involve verbal responses to cognitive tasks, a series of games may be designed to deal with affective outcomes. For example, one such game may involve the reactions of different children (e.g., normal, emotionally-disturbed and EMR) to different types of frustrating situations (at home, in school and in the playground).

The next step in the task analysis is to decide upon the form of response to be anticipated. This may range all the way from being extremely precise--as in specifying a verbatim response--to being relatively crude--as in estimating the percentage of correct and incorrect responses.

Three major developmental activities

Upon the completion of the task analysis we would have specified the parameters of the game and its instructional objective. This specification would include the dimensions along which people and situations are to be classified and the nature of the response to be anticipated. At the conclusion of the task analysis, the development of the game proceeds along three different branches:

1. Preparing question cards and collecting norms
2. Design and development of the game.
3. Constructing testing instruments and validating the game

These three activities are interdependent: Unless question cards are supplied with norms, it is impossible to develop the final version of the game; until the game is finalized, we cannot validate it. However,

since each of these activities may be time-consuming, they could be carried out in a parallel fashion. The general format of the game could be developed even while the question cards are being standardized; tests could be constructed while the game is being refined.

Preparing of Question Cards and Collecting Norms

In this activity, various situations typical of the ones in real life in which anticipation is to be attempted, are created. This usually involves the production of a set of cards with descriptions of different situations ("John is praised for being correct."), instruction for different tasks ("List three good-manners words.") or different types of questions ("Who was Abraham Lincoln?"). A minimum of about twenty cards in each situational category is recommended to prevent practice effect. Within each category the cards should contain a wide variety of irrelevant variables. Thus, for example, if the situation is classified according to curricular areas, then each of them should include different types of questions. On the other hand, if the types of questions is the variable in the game, then each type should have questions from a wide variety of curricular areas. Also, the questions (or tasks or situations) should be equally applicable to different groups represented in the game. For example, a game involving critical situations in the classroom should not contain only those found in an inner-city school if it were to compare the responses of children from different types of schools.

Question cards are edited by an expert who is familiar with the subjects and the situations. During this step he should not only identify errors and ambiguities but also check for realism, representativeness, comprehensive coverage and suitable classification of the question cards.

Collecting norms

The next step is the collection of actual student response data for the items on the question cards. Details of this standardization procedure are available in any text on test construction and may become rather involved depending upon the complexity of the game. Generally it involves finding suitable groups at various levels of the population, choosing random samples from them, administering the items and collecting data. A game involving different situations (rather than questions) may require lengthy observation and coding of behavior while another about affective reactions may use direct interviews and attitude scales.

Collecting actual data is undoubtedly time-consuming and expensive. However, it is this procedure which gives the game its strength as a teaching tool. The variations in responses reflect the vagaries of real life. But to those who want to save time and money we have come up with some short-cut methods.

One inexpensive method is to use data already available with standardized tests. Similarly, data from various studies and surveys could also form the basis for a game. Tables found in research literature are usually too condensed to be useful. In such cases, the original investigators may be contacted for their raw data. If these are not available, we may use the most detailed summaries available to randomly re-create a close approximation of the original data. For quicker results, we may use an n=1 by concentrating on representative individuals as in our game BOB AND ALICE AND TED AND CAROL (page 8). In this situation, the savings in time is offset by the limited generalizability of the norms. As a last resort, one may use artificial data to avoid collecting actual

ones. Such data may be generated on the basis of a theoretical model or a conceptual framework. However, any data which fit the curve perfectly may oversimplify reality and mislead the learners. Unless the instructional intention is to do so, this method is extremely undesirable. However, artificial data could be used during the developmental testing of the game to avoid being held up by the collection of actual data.

DESIGN AND DEVELOPMENT OF THE GAME

Meanwhile, back at his desk, the game designer could be creating his game while the collection of norms for the question cards is going on. The parameters of the game are already provided--different levels of the population, different types of situations and the response to be anticipated. All of these are translated into game variables as in the basic format of the board-and-counters format. With a little ingenuity a wide variety of games may be devised which are to be used instead of, or in addition to, the basic game.

The first thing in designing a new game is to make sure that winning the game depends upon the accuracy of anticipation. However, if this were the only requirement, the activity becomes a test rather than play. Hence, the next thing is to introduce some elements of chance and of competition. Ideas for novel games could be obtained by adopting and combining various aspects of time-tested games. The appendix contains two variations of the anticipation game, TWENTY-FIVE and EASIER QUESTION. The first of these is based on a commercial game called GO TO THE HEAD OF THE CLASS and some moves of PARCHESSI. The second game is based on an ancient children's card game called I DOUBT IT.

The basic design of any game could be improved by checking it against the following list of characteristics of highly-motivating games:

1. The game should have simple rules.

Most successful games have very simple themes. If your new game seems too complex, it could be split into a number of simpler games, each dealing with one subtask of the total task. Alternatively, you may design a series of games of increasing complexity to lead your players to the most complex one. For example, the first game in our series may be a two-dimensional one in which the board represents types of learners and curricular areas along the vertical and horizontal axes. The next game may involve three-dimensional anticipation in which age level is introduced as the third variable. This game may be played on a three-layer board such as those used for playing three-dimensional tic-tac-toe. Ultimately, the game may grow up into a four-dimensional one requiring the anticipation of the response by a particular type of child at a given age to a particular type of question in a specific area. However, at this stage we might have reached the stage of excessive complexity.

2. The game should have a simple scoring system.

Paper and pencil score keeping becomes an extremely dull activity, especially if it involves frequent recording and complex calculations. Score keeping is reduced in our sample games through the use of a board and different counters. In race games, such as TWENTY-FIVE (see appendix), the score keeping function is built into the moves of the pieces. In EASIER QUESTION, the player's score is reflected by the number of cards he manages to get rid of. Ideally, any score keeping procedure should be automatic and should immediately indicate who is winning.

3. The rules of the game should be fair.

No player should have an undue advantage over the others. If such a disparity occurs due to our attempt to simulate real life, there should be compensatory provisions. For example, in one version of our game, one of the players is given the role of an expert and is provided with a set of generalizations which are useful in anticipating the responses of different learners. However, the other players have the option of forming a coalition against him. In some other games which involve different roles for different players, these roles are systematically rotated among the players.

4. Provide handicapping arrangements in the rules.

No player enjoys losing or winning consistently. To enable players with different abilities to compete with each other, our anticipation games use an adjustable criterion for successful anticipation: An expert has to guess the percentage within three points while a naive player is considered to be successful if he gets within ten points of the actual percentage. Even in games among players of equal expertise, the criteria for successful anticipation may be made more stringent at the later stages of the game to keep all players challenged at all times.

5. All players should participate in the game at all times.

It is essential to prevent players from having nothing to do during certain times of the play of the game. All players should have something to do even if it is just keeping scores or judging whose anticipation is closer to the value on the table. If necessary, the number of players may be reduced and time limits imposed to speed up the action. If the decision by one player takes up too much time, the

challenge rule may be introduced. This provides an opportunity for other players to challenge the original decision maker if they believe him to be incorrect and thus increase his penalties. Such challenges induce all players to make their own decisions during each round. Another thing to be avoided in a game is the elimination of a player in the middle of the game, either as a penalty or as a reward. In the game TWENTY-FIVE (see appendix), if the first player to reach the goal drops out of the play while the others continue (to determine the second best player), the winner has nothing to do. It will be more effective to terminate the game as soon as one player reaches the goal.

6. The criteria for winning the game should suit the amount of time and player's inclinations.

The essential component of the anticipation game is the round during which one player gets his turn to do something. Each round may be a game, although it is desirable to cumulate the score at least until each player has had his turn. Different criteria for winning may be set up to increase the excitement of the game. The same set of rules apply to each round of the game until somebody reaches these criteria. Some games like TWENTY-FIVE have a natural termination (i.e., reaching the goal box) while others are more flexible. Games may end when a pre-specified score is reached or at the end of a specific time period. In the latter case, whoever has the highest score at that time wins the game.

Developmental Testing.

However effective the designer may think his game to be, the real test is with actual players. The earlier the game is tried out with players, the easier it will be to prevent major problems. By starting out with a minimum set of rules, all unnecessary complications may be avoided. During the earlier stages of developmental testing, allow players to come up with ad hoc rules and minor variations in the play. A tape recorder would be a handy device for recording these spontaneous suggestions without disrupting the game. Hold a debriefing session at the end of each game for identifying major areas of weaknesses. Minor modifications in the rules could be made during the play of the game itself. Major modifications in the equipment or in the basic format should be undertaken between tryouts. All revisions should be checked with a fresh group of players to ensure that they do, indeed, improve the game.

Construction of Tests and Validation of the Game

Tests and scales to accompany the game.

A number of tests on anticipation skills are constructed independent of the development of the game to serve three functions:

a. to collect feedback during developmental te ting of the game to strengthen its instructional effectiveness,

b. to demonstrate the effectiveness of the game during validation testing, and

c. to relate degree of accuracy in anticipation to various other factors in order to develop valid predictors of anticipation skills.

The most direct and valid measure of the effectiveness of the game would be a test using the same type of question cards and requiring the

same type of responses as in the game. A suitable criterion test may be constructed by randomly pulling out a representative sample of question cards from those used during the game and by requiring the student to predict the responses of different types of children to these questions just as in the game. The degree of accuracy of anticipation may be calculated as the deviation of the student's prediction from the actual response data collected during the standardization procedure. By ensuring that the same question cards are not used during the game, we could test for transfer rather than rote memory.

Although such a test would reliably reflect increased accuracy of anticipation, it would not measure other mediating behaviors. It is hypothesized that a more successful anticipator has a larger number of valid hypotheses relating the types of children, the tasks and the probabilities of their success. One of the outcomes of playing anticipation games is an increase in the number of hypotheses in a player's repertoire. This may be measured directly with an open-ended question attached to the earlier test:

Think back upon the logic behind your predictions.

List various principles (or hypotheses) which you might have used in making your estimates:

Anticipation is not merely a cognitive skill; it has an attitudinal dimension as well. The attitudes of players toward different children undergo a change as a result of playing the game. Such attitude changes may be measured through the semantic differential or Likert scales.

Validation testing

The final stage in the development of any instructional material is that of validation testing. During this stage, the material is tried out

with a group of representative students under specified (and replicable) conditions and data on the changes of their behavior are collected. The major function of validation testing is to demonstrate the effectiveness of the game and to answer the question, "Who learns what under what conditions in how much time?" (Markle, 1971).

Description of the subjects. To answer the question, "Who learns?" we provide a description of the student group which was involved in the validation of the game (and which represents the target students for whom the game was designed). To be useful to the potential users of the game, this description should be in terms of various factors associated with anticipation skills. Such factors may include the following:

Biographical data:

- Sex
- Previous experience with children
- Nature of experience (teaching, volunteer work, etc.)
- Frequency of contact with children

Personality measures:

- Dogmatism
- Intellectual and interest modes

Intelligence

Attitudinal Measures:

- Vocational interests
- Attitude toward exceptional children

Information:

- On exceptional children
- Developmental psychology
- Different curricular areas

Learning gains. To determine what is learned by the players, a simple pretest-game-posttest design may be used. Accuracy of anticipation could be the main dependent measure while number of hypotheses generated and changes in attitudes could also be measured. For play of games over an extended period of time with breaks or for measuring delayed retention, one or more control groups may be introduced. Alternatively, to avoid reactivity due to testing, a learning curve may be drawn using the player's deviation scores for each round. This data could be automatically and unobtrusively trapped by requiring the players to record their anticipations on a game sheet for each round. A sample record sheet used with the game TRUE GRID is shown in the appendix. This data could directly be used to plot deviation scores against trials. Such an activity may very well be included in the debriefing session after each game so that the players themselves could see the effects of the game.

Instructional situation and time. A description of the instructional situation should include such details as the timing of the games (massed vs. spaced), methods used for training the players and the availability of different resources (teachers, experts and specialists, reference material, different types of children, etc.). The time required to set up the game, to teach it and play it and the time required for various follow-up activities should be collected and reported as a part of the validation testing procedure.

APPENDIX

Twenty-Five

EQUIPMENT

1. Question Cards. There are question cards of four different colors representing the four curricular areas of reading, language, arithmetic and work-study skills.

On one side of the card there is a multiple-choice question. The other side contains a table of percentages of children (grouped by age and IQ level) responding correctly to the question.

2. Game Board. This is a 5 x 5 board with 25 squares. Three of these squares are shaded and marked "safe." The pieces move over the board in a spiral fashion.

3. Dice. Three specially marked dice are used in this game to determine the curricular area, the type of children, and the age of children. The first die has four different colors on four of its faces (corresponding to the colors of the curricular areas) and the letters I and U on the other two faces. The second die has N (denoting normal), IQ 66-80, and IQ 50-65 on two faces each. The third die has the numbers 9 through 14 representing six different age levels.

4. Pieces. Each player uses two plastic counters of his own color as movable pieces.

GENERAL DESCRIPTION OF THE GAME

The object of this game is to move one of your pieces to the twenty-fifth square. Pieces are moved forward by successfully anticipating the

percentage of children responding correctly to a given question. A piece moving into a square occupied by an opponent piece may knock it off and send it back to the start box.

PRELIMINARY

Players seat themselves around the board. Question cards are shuffled in separate stacks of the same color and placed on the table with their question sides up. Players roll the die with the colored faces. The first player to turn up the letter "I" starts the game.

THE PLAY

1. Choosing the variables. During his turn, each player has the option of specifying one or more of these three variables:

type of child

age of child

curricular area from which the question card is drawn

Whatever variables are left unspecified by the player are determined by the roll of dice. Thus a player may specify normal children and roll the other two dice to determine the age level for these children and the curricular area. The more variables are left to chance, the higher the score. (See Rule 4.)

2. Estimating the percentage. Once the levels of the variables are chosen (either by player specification or by the roll of dice or both) a question card is removed from the middle of the appropriate curricular area stack. The player then estimates the percentage of the specified type of children (at the specified age) responding correctly to the question.

3. Finding the difference. The player on the left now turns over the card and reads off the actual percentage for the specified group. He calculates

the difference between this percentage and the player's estimate.

4. Moving the piece. If this difference is greater than the limit of 10, the player chooses one of his pieces and moves it backward one square. If none of his pieces are yet on the board, there is no penalty. If he has only one piece on the board, the backward move applies to this piece.

If the difference between the actual and estimated percentage is within the limit of 10, the player moves one of his pieces forward. The number of squares this piece moves depends upon the number of chances the player took. If he specified all three variables (type of children, age and curricular area) he moves forward one square. If he left one or more factors to chance he will move twice the number of dice he rolled. For example, if he specified the type of children to be low educables and rolled two dice to determine the age and the curricular area, he will move forward four squares. If he rolled all three dice, he will move forward six squares.

The forward moves may be applied to either of the player's pieces from anywhere on the board or from the start box. However, the total move must be used by the same piece; it may not be split between the two pieces. (See Rules 6 and 8.)

5. Continuing the game. At the end of his turn, after moving his piece forward or back, the player passes the dice to the next player on his left. Play progresses clockwise.

6. Knocking off a piece. If a player's move ends in a square occupied by an opponent, the opponent's piece is knocked off and returned to the start box. Only a piece which is moving forward may knock off another piece; none may be knocked off by a piece moving backward for penalty. A piece may not knock off the opponent from any square en route; only the piece in the last

square of a move is knocked off. No player may knock off his own piece. Two pieces of the same color may occupy the same square. (See Rule 7.)

7. Extra turn for knocking off a piece. A player who knocks off a piece gets an extra turn immediately. He retains the dice and begins the next round.

8. Safe squares. Three of the squares are shaded and marked "safe." These are safe squares from which no piece may be knocked off. Any number of pieces of any color may occupy a safe square at the same time.

9. Blockading. Two pieces of the same color on the same square (which is not a safe square) form a blockade. No other piece may cross over this blockade. If another player's forward move will end up at the blockade or beyond it, the move cannot be used; the piece remains in its original position. This rule does not affect the pieces which are already ahead of the blockade.

10. Adding one. If a player thinks that his opponent's estimate is way off, he may increase the penalty by saying "Add one." In this case, if the estimate is beyond the 10 point limit, the penalty move is two squares backward (instead of the usual one square). However, if the estimate is within ten points, the original player moves an extra square forward. The player who added one moves one of his pieces backward by one square.

The extra "add one" move is used only after knocking off any piece at the end of the original move. Thus, if there is an enemy piece on the fourth square and if the player rolled two dice in an attempt to knock it off, the other player cannot safeguard his piece by simply adding one. In this case, the player will knock off the piece (if he were successful) and then move an extra square.

11. Winning the game. The object of the game is to get one of the pieces to the twenty-fifth square or beyond. The last move of the piece need not bring it exactly to the twenty-fifth square. If the move takes the piece beyond, the player still wins the game.

12. Handicapping. The 10 point difference limit may be reduced to five points or less as the players gain more experience. With players at different levels of expertise, each player may have a separate limit based on his ability. Thus the expert player may have to be within three points, another player within seven points, and the beginner within ten points.

Easier Question

EQUIPMENT

1. Question Cards. There are question cards of four different colors representing the four curricular areas of reading, language, arithmetic and work-study skills.

On one side of the card there is a multiple-choice question. The other side contains a table of percentages of children (grouped by age and IQ level) responding correctly to the question. Of special interest to this game is the last column of the table labeled 60% Age. This column contains the median age at which 60% of EMR and normal (Rep. Sample) children respond correctly to the question. This figure indicates the relative difficulty of the questions: The smaller the age, the easier the question. The letter N in this column indicates that the median age is above 18 years.

2. Poker Chips. Each player is provided with 20 poker chips. All chips are of the same value, even if they happen to differ in color.

GENERAL DESCRIPTION OF THE GAME

The object of this game is to win as many poker chips as possible. To win a chip, the player has to get rid of a card in his hand by discarding it on top of a card with a more difficult question. A player may also bluff other people into believing that the card he is discarding has an easier question even when it is not so. Challenging a player who is bluffing also earns a chip. Play ends when one player gets rid of all the cards in his hand.

PRELIMINARIES

Question cards of only one color are used in a game. Players choose a suitable curricular area before the game. They also decide between normal and EMR children as subjects for the game. The 60% ages of only the chosen group is used in the game.

THE PLAY

1. The deal. Any player may shuffle the stack of question cards of the chosen color and deal three cards to each player, one at a time. The rest of the cards are placed on the table with the question sides up, to form the stock.

2. Determining the first player. All players now study the question on the top card of the stock. Each may refer to either side of the cards he holds in his hand. Each player gives an estimate of the 60% age for the top card of the stock. This card is turned over and placed beside the stock to become the first card of the discard pile.

The player whose estimate is closest to the 60% age given in the table has the first turn. Thereafter, the turn passes clockwise.

3. Discarding. During his turn, each player is supposed to discard a card with a question which is easier than the one on the top card of the discard pile. Thus, the 60% age for the card he discards must be higher than the one on the top card of the discard pile. However, since the discard is made with the question side up, no one knows for sure if this is so. If the player has no suitable card for discarding, he may either pass or bluff by discarding any card he wants to.

4. Responding to the discard. Beginning with the player on the discarder's left, all players now have the option of either believing or doubting the discard. If the player thinks that the discarder is trying to unload a card with a more difficult question, he may challenge it by saying, "I doubt it."

5. If no player doubts the discard, it is turned over. If the 60% age is higher than the one on the top card of the discard pile, no player pays or collects a chip. On the other hand, if the discard has a 60% age equal to or lower than the one on the top card of the discard pile, this is a successful bluff. In this case the discarder collects a chip from all players.

The last discard is now placed on top of the discard pile, with the table side up.

6. If any player doubts the discard, it is immediately turned over. If the 60% age is higher than the one on the top card of the discard pile, the challenge is unsuccessful. If it is the same as or lower than the age on the top card of the discard pile, the challenge is successful.

If the challenge is unsuccessful, the challenger (a) pays a chip to the discarder and (b) picks up as many cards from the stock as there are in the discard pile.

If the challenge is successful, the discarder (a) pays a chip to the challenger, and (b) picks up as many cards from the stock as there are in the discard pile.

The discard pile is now removed and placed below the cards in the stock. The last discard remains face up on the table to form a new discard pile.

7. Continuing the game. The next player on the left now has the turn to discard. If he does not have a suitable card, and if he does not want to bluff, he may pass. if all other players pass (as when the top card of the discard pile has a very high 60% age), players begin the next round by guessing the percentage for the top card of the stock as at the beginning of the game. After identifying the player with the closest estimate of the 60% age, this card is placed (table side up) on top of the discard pile. Play proceeds as before.

Last-card warning. Any time a player has discarded all but one card in his hand, he announces the fact to the other players.

Ending the game and determining the winner. Game ends when a player has successfully made his last discard. At the end of the last round he may collect for bluffing or for any unsuccessful challenge. He then collects from each player a chip for each card in his hand.

The winner of the game is the player with the most chips at the end of the game. Usually the player who makes the last discard also wins the game. However, some other player might have accumulated more chips during earlier parts of the game.

RECORD SHEET FOR ANTICIPATION GAMES

PLEASE fill in all appropriate boxes during each round.

Round Number	Question Card Number	Your estimate			Actual Percentage (from table)	Difference
		Normal	66-80 IQ	50-65 IQ		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						